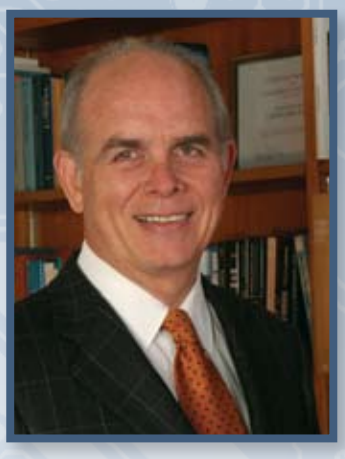


Bernie Machen, President

"Inventiveness" Spurs Florida Economy

UF spin-off companies foreshadow state's high-tech future

Last March, President Obama gave a speech at the White House titled "Investing in Our Clean Energy Future."

His main point was that the nation's clean energy innovators will help bring about energy independence — while creating new jobs and industries to drive economic recovery.

One of his leading examples was Sinmat, a Gainesville startup featured in this issue. Sinmat is engineering better ways to build microchips used in smart energy systems such as efficient lighting. The president introduced Deepika Singh, who founded Sinmat with her husband Rajiv, a UF professor of materials science and engineering.

President Obama told Deepika and the other innovators, "It's said that necessity is the mother of invention. At this moment of necessity, we need you. We need some inventiveness."

What's true for the nation is also true for this university, for this region and for Florida.

Like most other universities, UF faces severe cuts due to the state's steep fall-off in tax dollars. At the statewide level, Florida is struggling to find its way now that the mainstays of housing and tourism are in such sad shape.

People in the tech community say successful commercialization rests on four pillars: exciting technology, entrepreneurship, investment, and good location.

Research, technology transfer, startups — in Obama's word, "inventiveness"— all offer a proven path to a better future.

For evidence, we need only look to the past.

People in the tech community say successful commercialization rests on four pillars: exciting technology, entrepreneurship, investment, and good location.

We have demonstrated success in all four areas here at the University of Florida.

"The Today Show" this winter featured WiPower, another UF spin-off profiled in this magazine. Also, the BBC was in town not long ago to film a segment on Sharklet Technologies, which makes a unique antimicrobial coating for medical devices. These are just two of several startups that have drawn national attention in recent years.

Win Phillips,
Vice President for Research

Progress Corporate Park

Sid Martin Biotechnology Development Incubator

"It's said that necessity is the mother of invention. At this moment of necessity, we need you. We need some inventiveness."

— President Obama

We also have a track record of successful entrepreneurs.

Look no further than Progress Corporate Park, adjacent to the Sid Martin Biotechnology Development Incubator. Some 1,200 people work in the park currently — 85 percent at successful UF spin-offs.

Investment is another strength. To be sure, the downturn has made it tough to attract angel and venture funding, but last year UF spin-offs cracked the $100 million mark in venture funding. And, since the Sid Martin Incubator was founded in 1995, its current and former occupants have brought in at least $300 million in private investment dollars as well as $100 million in grants.

Last but not least, there is a lot going on in this region.

We are part of the Florida High Tech Corridor Council, which works to bolster the technology industry in a 23-county region throughout central and North Florida. More locally, the Sid Martin Biotechnology Development Incubator is full, with nine companies occupying all of its space.

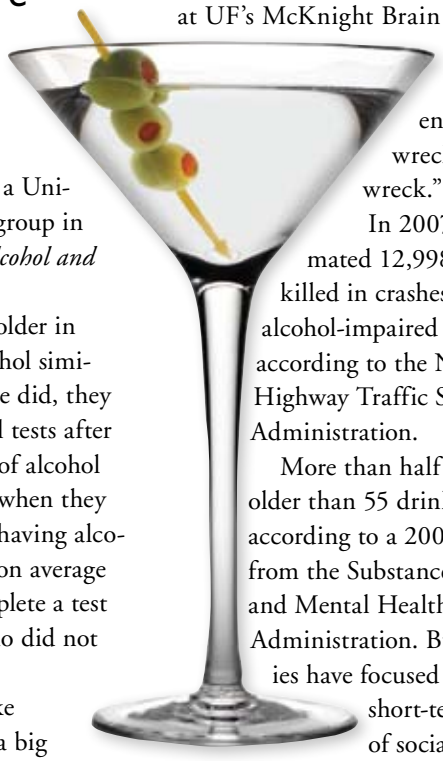
The City of Gainesville's incubator, the Gainesville Technology Enterprise Center, is also full, with nine of its own companies.

Indeed, there is so much demand for startup support that earlier this spring we made the decision to pursue another incubator on the Alachua General Hospital property.

In our proposal to the federal Economic Development Administration for a major grant, we argued that nurturing small, innovative companies is essential to restoring and diversifying Florida's economy. The more we can do on this score, the better, and this new incubator can add another vital pillar of support.

Extracts

Study: Alcohol Affects Older Adults More



Older, active people who have a drink or two might be more impaired afterward than they think, according to a report from a University of Florida research group in the *Journal of Studies on Alcohol and Drugs*.

Although people 50 or older in the study metabolized alcohol similarly to how younger people did, they performed worse on special tests after having moderate amounts of alcohol and did not always realize when they were impaired. Soon after having alcohol, older adults also took on average five seconds longer to complete a test than their counterparts who did not have a drink.

"That doesn't sound like much, but five seconds is a big difference if you're in a car and need to apply the brakes," said lead author Sara Jo Nixon, a psychiatry professor at UF's McKnight Brain Institute. "It can mean the difference between a wreck and not-a-wreck."

In 2007, an estimated 12,998 people were killed in crashes involving alcohol-impaired drivers, according to the National Highway Traffic Safety Administration.

More than half of adults older than 55 drink socially, according to a 2008 report from the Substance Abuse and Mental Health Services Administration. But few studies have focused on the short-term effects of social drinking among older adults.

Previous research mainly investigated consumption of large amounts of alcohol at one time, and generally in young people. But results from studies of younger adults might not be applicable to older people because of age-related declines in cognitive skills, as well as changes in how alcohol is metabolized and removed from the body.

Nixon's group aimed to expand understanding of the effects over time of moderate levels of alcohol consumption in healthy, active older adults.

"You want to know how long does it take for them to become sober enough to engage in potentially dangerous activity such as driving," Sullivan said.

The study involved 68 nonsmokers — one group ages 50 to 74 and a comparison group ages 25 to 35 — who had at least one drink a month. Within each group, some individuals

Mite Could Put The Bite On Chilli Thrips

Amblyseius swirskii

Chilli thrips sound more like a snack food than an agricultural menace, but these tiny insects threaten many of the Sunshine State's most important crops. Fortunately, University of Florida research shows a predatory mite gobbles them up like popcorn.

On bell pepper plants in greenhouses, the mite consumed enough chilli thrips to keep the population to less than one per leaf, compared with 70 per leaf on control plants. Similar results were obtained with peppers grown outdoors. The study was published in April in the journal *Biological Control*.

Native to Asia, the invasive pest attacks more than 100 host plants, including corn, citrus, peanuts and tomatoes. Established first in the Caribbean, it spread to Florida in 2005 and then to Texas. Adult chilli thrips are about 1 millimeter long.

According to a U.S. Department of Agriculture estimate, if chilli thrips become more widely established in the U. S., they could cause agricultural losses of almost $4 billion per year.

Chilli thrips

For greenhouse crops — including bell peppers, strawberries, basil and flowers such as Gerber daisies — the mite could provide a much-needed alternative to pesticides, said Lance Osborne, a professor with UF's Institute of Food and Agricultural Sciences and an author of the study.

"This mite has a lot of potential for greenhouses, which is where it's used now," Osborne said. The mite, which has no common name but is known scientifically as *Amblyseius swirskii*, is available commercially to manage whiteflies and broad mites.

Because the mite is already approved for use in Florida, growers can try it against chilli thrips, he said. Osborne cautioned that the mite is not likely to be successful on every crop the pest attacks. Researchers were happy

were given alcohol while others were given a placebo beverage that did not elevate their breath alcohol levels.

When a person consumes alcohol, concentration in the blood builds to a peak, then dissipates. During the first phase of the metabolic process, alcohol has a stimulating effect. During the second phase, there is a sedative or depressive effect.

During each phase — at 25 minutes and 75 minutes after alcohol consumption, respectively — participants were given tests that required them to draw lines connecting numbered and lettered dots on a paper, in chronological order, without lifting the pen from the paper. They were timed and evaluated for how many errors they made.

The first test involved numbers, while the second involved alternating between numbers and letters. Those tests give clues about a person's mental processing related to movement, and about the ability to mentally shift from one problem-solving strategy to another. The researchers also asked participants to rate on 10-point scales how intoxicated they felt, and how much they thought the alcohol impaired their performance.

Older adults who had alcohol took longer to complete the tasks than younger adults who had alcohol. But there was no such age difference between the older and younger groups that had not had alcohol. The researchers found that even though blood alcohol levels for participants in both groups rose at a similar rate right after drinking and reached the same peak, the older adults did worse on tests. That suggested the performance gap seen after moderate amounts of alcohol was not because of age-related differences in how the body processes the substance, but rather because of other factors influencing how alcohol affected the individuals.

In the test portion during the "stimulating" alcohol phase, older adults who had alcohol were slower than those who had not had any. In contrast, alcohol seemed to give the younger group a performance boost during that phase.

During that same post-drinking phase, when the older adults were impaired, they didn't think they were. And in the second phase — an hour and 15 minutes after having alcohol — older adults thought their performance was impaired, even when it wasn't.

"An older person might say 'Really, I feel all right, I'm sure I can drive,'" Sullivan said. "But the study shows that you can't always take someone at their word."

So what advice would Nixon give to active, older adults?

"If you have a couple of drinks at dinner, sit around, have dessert — don't drive for a while."

Czerne M. Reid

to find the mite held up well outdoors on bell peppers. Previous attempts to establish the mite outside on rose bushes have been unsuccessful, he said. "Maybe there is a plant issue — they prefer peppers, but not roses," Osborne said.

An upcoming project will investigate the use of peppers as "banker plants" — the mite equivalent of birdhouses, said Cindy McKenzie, a research entomologist with the USDA's Horticultural Research Laboratory in Fort Pierce.

In the project, ornamental peppers will be planted outdoors among rose bushes to see if they can harbor mite populations that protect both plant species, said McKenzie, another author of the study.

If successful, this approach could be helpful to rose gardeners, especially in the Orlando area, hard-hit by chilli thrips. And if you've never heard of ornamental peppers, McKenzie said they make a nice addition to the landscape.

"We screened more than 20 ornamental peppers and narrowed it down to four," she said. "They're very pretty varieties, with dark purple and green leaves."

Researchers also hope to develop a pesticide-resistant strain of the mite, Osborne said.

"That way, if a grower has to come in and spray, it won't disrupt the biological control," he said. Osborne previously developed a resistant strain of another predatory mite.

The current study was part of an ongoing collaboration between scientists with UF and the USDA, aimed at minimizing chilli thrips damage.

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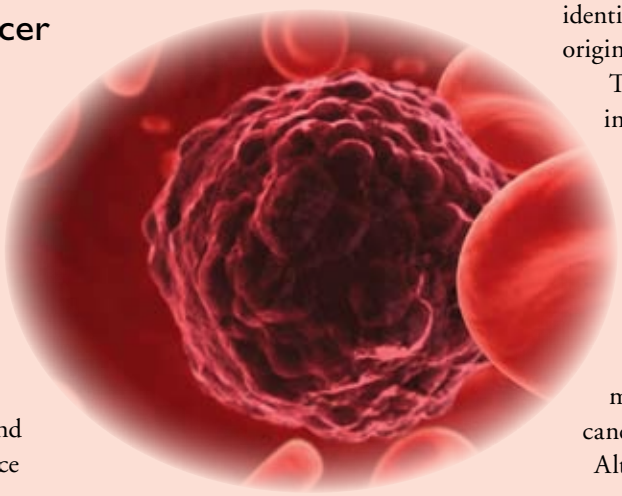
Tom Nordlie

Extracts

Biomarker May Show 'Root' Of Colon Cancer



To truly kill colon cancer and eliminate the risk of recurrence, it is important to kill the "root" of the disease, according to a University of Florida College of Medicine surgeon.

"It's like a dandelion — if you don't kill the root it just keeps coming back," said Dr. Emina Huang, a UF colorectal surgeon, who added that colon and rectal cancers have high recurrence and spread rates, especially if the disease is not found until advanced stages.

Her findings, featured in April in the journal *Cancer Research*, identify a biomarker for colon cancer stem cells that she believes will help researchers further evaluate the cancers' origins and progression. The discovery sheds light on the cancer stem cell theory, an idea that has arisen because cancer cells and stem cells share many qualities, including the ability of cancer stem cells to demonstrate self-renewal.

The research determined a protein called aldehyde dehydrogenase 1, or ALDH1, can be used to identify, isolate and track these ultra-resilient cells throughout the development of malignant colon or rectum disease. Previously used markers cannot as precisely track colon cancer stem cells.

"Without a better handle on what cells might be contributing to cancer metastases and recurrence, we won't have any targets to go after," said Huang, an associate professor in the UF department of surgery and a member of the Program in Stem Cell Biology and Regenerative Medicine at the UF College of Medicine. "This gives us a potential target."

According to the American Cancer Society, about 150,000 Americans are diagnosed each year with colorectal cancer, and more than 50,000 die from the disease. In addition to the potential advances in therapeutic strategies, Huang said having a more direct target to explore will benefit progress in the areas of diagnostics and prevention.

In collaboration with Dr. Bruce Boman, a professor of medical oncology at Thomas Jefferson University in Philadelphia, Huang chose to evaluate ALDH1 because of its known association with breast, brain and other cancers. In addition to being a strong marker for malignant colon stem cells, the researchers believe ALDH1 may be a marker for benign colonic stem cells. Whether these two types of colonic stem cells are one of a kind still needs to be determined.

Researchers implanted human colon tissue cells into mice and analyzed the resulting growth. Although normal cell tissue was evaluated, it never replicated in the mice — only the tissue that was malignant grew. Comparing ALDH1 patterns with that of the previously used markers, the researchers found ALDH1's presence was much more targeted, suggesting a way to more definitively identify colon cancer stem cells in the original tissues.

They also noted that ALDH1 indicated an increasing number of colonic stem cells throughout the progression of colon tissue's transformation from normal cells to premalignant cells to cancerous cells. These findings support the theory that an increase in ALDH1 expression marks the tumor growth in colon cancer stem cells.

Although the theory that cancers are seeded by cancer stem cells is still becoming scientifically accepted, Huang said she thinks that in every cancer there is a small fraction of cells capable of reproducing the cancer. If these unique cells are not killed or removed during treatment, the cancer will not be entirely destroyed.

While changes in patient care are most likely years away, she says the findings give researchers an immediate target to focus on as they try to develop new medical interventions and optimize treatment regimens to completely kill the disease.

Potentially, tumors could be examined to determine if there is an overwhelming expression of the biomarker, or tests taken to determine if the biomarker may be circulating in the bloodstream — scenarios that could possibly indicate a worse outcome, thus signaling the need for more aggressive treatment.

"The next step is to look at some of the predisposing conditions and see if the pattern is suggestive of anything we can do in the prevention mode," said Huang, who noted that people with inflammatory bowel disease, for example, have a higher risk of cancer.

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Jennifer Brindise

Vitamins Might Help Prevent Hearing Loss

Vitamin supplements can prevent hearing loss in laboratory animals, according to two new studies, bringing investigators one step closer to the development of a pill that could stave off noise-induced and perhaps even age-related hearing loss in humans.

The findings were presented at the Association for Research in Otolaryngology's annual conference by senior author Colleen Le Prell, a researcher at the University of Florida.

The supplements used in the research studies are composed of antioxidants — beta carotene and vitamins C and E — and the mineral magnesium. When administered prior to exposure to loud noise, the supplements prevented both temporary and permanent hearing loss in test animals.

"What is appealing about this vitamin 'cocktail' is that previous studies in humans, including those demonstrating successful use of these supplements in protecting eye health, have shown that supplements of these particular vitamins are safe for long-term use," said Le Prell, an associate professor in the UF College of Public Health and Health Professions' department of communicative disorders.

About 26 million Americans have noise-induced hearing loss, according to the National Institute on Deafness and Other Communication Disorders, the agency that funded the studies.

In the first study, UF, University of Michigan and OtoMedicine scientists gave guinea pigs the vitamin supplements prior to a four-hour exposure to noise at 110 decibels, similar to levels reached at a loud concert. Researchers assessed the animals' hearing by measuring sound-evoked neural activity and found that the treatment successfully prevented temporary hearing loss in the animals.

In humans, temporary noise-induced hearing loss, often accompanied by ringing in the ears, typically goes away after a few hours or days as the cells in the inner ear heal. Because repeated temporary hearing loss can lead to permanent hearing loss, the scientists speculate that prevention of temporary changes may ultimately prevent permanent changes.

In the second, related study in mice, UF, Washington University in St. Louis and OtoMedicine researchers showed that the supplements prevented permanent noise-induced hearing loss that occurs after a single loud sound exposure. The researchers found that the supplements prevented cell loss in an inner ear structure called the lateral wall, which is linked to age-related hearing loss, leading the scientists to believe these micronutrients may protect the ear against age-related changes in hearing.

The research builds on previous studies that demonstrated hearing loss is caused not just by intense vibrations produced by loud noises that tear the delicate structures of the inner ear, as once thought, said Josef Miller, who has studied the mechanisms of hearing impairment for more than 20 years and is a frequent collaborator of Le Prell's. Researchers now know noise-induced hearing loss is largely caused by the production of free radicals, which destroy healthy inner ear cells.

"The free radicals literally punch holes in the membrane of the cells," said Miller, a professor of communicative disorders at the University of Michigan.

Miller is the co-founder of OtoMedicine, a University of Michigan spin-off company that has patented AuraQuell, the vitamin supplement formula used in the studies.

The antioxidant vitamins prevent hearing damage by "scavenging" the free radicals. Magnesium, which is not a traditional antioxidant, is added to the supplement mix to preserve blood flow to the inner ear and aid in healing.

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Jill Pease

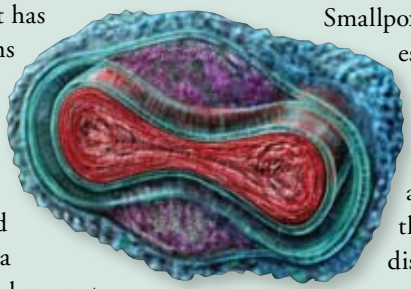
Extracts

Smallpox Shown To Inhibit Inflammation

University of Florida researchers have learned more about how smallpox conducts its deadly business — discoveries that may reveal as much about the human immune system as they do about one of the world's most feared pathogens.

In findings published in May in the *Proceedings of the National Academy of Sciences*, scientists describe how they looked at all of the proteins produced by the smallpox virus in concert with human proteins, and discovered one particular interaction that disables one of the body's first responders to injury — inflammation.

"This virus that has killed more humans than any other contains secrets about how the human immune system works," said Grant McFadden, a professor of molecular genetics and microbiology at the College of Medicine and a member of the UF Genetics Institute. "I'm always amazed at how sophisticated these pathogens are, and every time we look, they have something new to teach us about the human immune system."



Smallpox Virus

With researchers from the University of Alberta, the Centers for Disease Control and Prevention and a private company called Myriad Genetics, UF researchers for the first time systematically screened the smallpox proteome — the entire complement of new proteins produced by the virus — during interactions with proteins from human DNA.

These protein-on-protein interactions resulted in a particularly devastating pairing between a viral protein called G1R and a human protein called human nuclear factor kappa-B1, which is believed to play a role in the growth and survival of both healthy cells and cancer cells by activating genes involved in immune responses and inflammation.

"One of the strategies of the virus is to inhibit inflammation pathways, and this interaction is an inhibitor of human inflammation such that we have never seen before," McFadden said. "This helps explain some of the mechanisms that contribute to smallpox pathogenesis. But another side of this is that inflammation can sometimes be harmful or deadly to people, and we may learn a way to inhibit more dangerous inflammation from this virus."

Smallpox is blamed for an estimated 300 million deaths in the 20th century alone, and outbreaks have occurred almost continuously for thousands of years. The disease was eradicated by a worldwide vaccination campaign, and the last case of smallpox in the United States was in 1949, according to the CDC. The last naturally occurring case in the world was in Somalia in 1977.

With the exception of stores of the virus held in high-containment facilities in the United States and Russia, smallpox no longer exists on the planet. Since it was no longer necessary for prevention, and because the vaccines themselves were risky, routine vaccination against smallpox was stopped. However, public health concerns regarding the possible re-emergence of the virus through bioterrorism have led to renewed interest in the development of treatments for the disease and safer vaccines.

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John Pastor

Best Protectors From Bullies? Girls Rule!

Playground bullies may meet their match from where they least expect — in the ranks of kids who are anti-bullies — and most of them are girls, a new University of Florida study finds.

"Boys may be more likely to bully, but girls are more likely to defend those being bullied," said Jim Porter, who did the research for his doctoral dissertation in counselor education at UF. "While a lot of attention has been devoted to bully prevention programs, very little recognition is given to kids who jump in and try to stop the bullying or comfort the victim."

These playground defenders merit attention because research shows that a majority of school shootings are committed by students who have been bullied, and victims of bullying are at risk for dropping out of school, suffering from depression and bullying others,

Porter said. Thirty percent of students in sixth- through 10th-grade report some experience with bullying, either as a victim or perpetrator, he said.

Schools overlook good Samaritans as they are putting a growing number of bully prevention programs in place, in some cases relying on peer mediation where students resolve the disputes themselves, with mixed results, Porter said.

"What is missing in these programs is they don't incorporate children who are already known to help victims," he said. "Understanding kids who defend against bullying may reveal a new avenue toward preventing school-related violence."

Porter surveyed 168 females and 101 males about how they believed their mother, father, best friends and favorite teachers would expect them to respond if they encountered another student being bullied. The offensive behavior included hitting, shoving, name-calling, teasing and ostracizing. Participants attended four middle schools in North Central Florida and were between the ages of 10 and 15.

Peer pressure can be a good thing, the study found. Students said teachers and parents were more likely than best friends to expect them to try to stop a bully, but they were more likely to actually intervene if the message came from a best friend. And more girls than boys reported feeling pressure from friends to come to a victim's aid, Porter said.

Eighty-five percent of girls surveyed said their best friend would expect them to defend or help a bullying victim, compared with only 66 percent of boys, Porter said. In contrast to this 19-point percentage gap, there was only a 1- to 3-percentage point difference in expectations for boys and girls' behavior by teachers, mothers and fathers, he said.

Being female or having more feminine traits as measured by a gender identity scale also increased the likelihood that a student would defend a bully, the survey findings showed.

"Gender stereotypes that girls are more nurturing and boys are more aggressive definitely play out in how we expect boys and girls to behave," he said. "Somehow we communicate these expectations to kids and it can affect their behavior."

Schools may be the ideal place to try to help change those ideas, said Porter, who is now a counselor at Alachua Integrative Medicine in Alachua. "The news sometimes suggests that violence makes schools a hazardous place to be, but schools also are where we can learn how to get along with others and become adults," he said.

Giving a role in bully prevention programs to bystanders who step in to defend the victims on the playground and in the classroom fits in with the recent trend in educational psychology toward positive reinforcement, Porter said.

"There was a time when people were more likely to think of punishing bad behavior," he said. "Now there is a push toward finding and rewarding good behavior."

Porter said he has always been interested in the subject of bullying because he was often beat up as a "new kid" moving from one community to another. "I never understood but always wanted to discover why some students were able to jump in and help others," he said.

Focusing on defenders illustrates dramatic changes in public attitudes, he said.

"There was a time when bullying was not researched because it was considered normal childhood behavior," he said. "It was thought of as being part of growing up — this learning to determine a pecking order, and making people stronger and weeding out the weak."

Bullying expert Drew Nesdale, a psychologist at Griffith University in Queensland, Australia, said this research suggests that a little recognized and under-used source of help might be found in the victims' peers. "Interestingly, the fact that children who help might be responding to the expectations of others is consistent with research that has identified the powerful effect of the norms or expectations of others on their behavior."

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Cathy Keen